D-E95

Stereo cassette tape deck

Operating guide

BEFORE USING

To obtain the best performance and ensure years of trouble-free use, please read this operating guide carefuly.

KEY TO ILLUSTRATIONS

① POWER (MAINS) SWITCH
② TIMER SWITCH
③ TAPE COUNTER
④ DIGITAL PEAK METER
⑤ BIAS FINE ADJUSTMENT CONTROL
⑥ REC. CALIBRATION CONTROLS
⑦ PEAK HOLD SWITCH
⑧ MONITOR SWITCH
⑨ RECORDING LEVEL CONTROLS
⑩ MICROPHONE SOCKETS (Left/mono and Right)
⑪ INPUT SELECT SWITCH
⑫ DOLBY NR SWITCH
⑬ TAPE SELECT SWITCH
⑭ AUTO/MEMORY REWIND SWITCHES
⑮ EJECT BUTTON
⑯ COUNTER RESET BUTTON
⑰ OUTPUT LEVEL CONTROL
⑱ HEADPHONE SOCKET
⑲ REWIND BUTTON
⑳ PLAYBACK BUTTON
㉑ FAST FORWARD BUTTON
㉒ STOP BUTTON
㉓ REC. MUTE BUTTON
㉔ PAUSE BUTTON
㉕ RECORD BUTTON
㉖ RECORD/PLAYBACK (DIN) SOCKET
㉗ LINE IN SOCKETS
㉘ LINE OUT SOCKETS
㉙ REMOTE CONTROL SOCKET
㉚ VOLTAGE SELECTOR
㉛ CONNECTIONS
㉜ CASSETTE MAINTENANCE
㉝ CLEANING

* Noise reduction system manufactured under license from Dolby Laboratories. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

PRECAUTIONS

- This unit is designed so that other units can be stacked on it, but do not stack extremely heavy objects on it.
- Never use any strong detergent or solvent for cleaning the cabinet of this unit, because it could lead to damage of the surface finish.
- Protect the unit against excessive heat (e.g. direct sunshine), dust, shock hazards and moisture.
- Be sure not to open the cabinet.
- Be careful not to damage the power (mains) lead. Be sure to take hold of the plug when pulling it out; do not pull the lead.
- Disconnect the AC power (mains) lead plug from AC outlet when the unit is not to be used for a long period of time or you are away from home.
- Do not stack in such a way that there is danger of blocking the ventilation holes. (Allow space near the ventilation holes if possible.)

IMPORTANT NOTICE

When using with other components, any component which can produce induction noise which can induce hum should be as far as possible from this deck. Bias leakage from this deck during recording may cause beats during reception of AM broadcasts, so be careful in placement of this deck and with respect to the tuner; when beats occur, move them away from each other it possible. There is no problem in FM reception.

FEATURES

- **Smooth Operation by means of the computer IC logic control**
  Light feather-touch operation has been made possible by use of the logic control with 2 motors, 2 solenoids and a computer IC.
  It is possible to change directly from the PLAY mode to the Fast Forward or Rewind mode, and vice versa without damaging the tape.
- **Close gap metal R & P combination head suitable for Metal Tape**
  A newly developed high density ferrite close-gap metal R & P combination head which can generate sufficient magnetic field for the high coercivity of Metal Tape is employed. In addition to the above, a special double-gap high hardness, high permability, special permalloy double-gap erase head is used to fully erase high coercivity tape. As a result, the excellent characteristics of Metal Tape are displayed such as the wide frequency response, extended high frequency dynamic range, reduced distortion at high input levels, sharp improvement of S/N ratio in the high frequency band, etc.
- **Computer memory rewind/Auto-rewind function**
  Repeating playback from the desired position is possible by means of the function of the computer IC.
  The control circuit can be operatd by means of the Hall switch IC at the end of the tape to rewind the tape automatically to enter the play mode (Auto-rewind play) or to enter the stop mode (Auto-rewind stop) after rewinding the tape.
  It is very convenient because the tape can be returned to the tape start position after it has been listened to or after recording.

- **Computer automatic recording mute function**
  When this button is pressed during recording, the unit enters the non-signal mode by means of the function of the computer IC for approx. 4 sec, and then automatically enters the recording pause mode.
  This is convenient for cutting narrations or for leaving gaps between tunes.
- **Digital peak meter with 2 colour and highly accurate level indication is used.**
  The green and red graph corresponds to the strength of the input/output signal, and it is displayed as such.
  Since it has rapid speed of response, the display always indicates the peak level very accurately.
  Very accurate level setting is possible.
  The series indication of both R/L channels enables the individual reading of left/right levels with ease, and checking the level is also easy.
- **Timer mechanism for unattended recording and alarm playback**
  With an external audio timer connected, automatic recording and waking up to music in place of an alarm at any desired time is possible.
- **Remote control operation**
  Remote control operation is possible using the optional remote control device (RB-100).
- **Double Dolby* Noise Reduction System**
  The Dolby NR system improves the signal-to-noise ratio by approximately 10 dB without affecting frequency response. With the double Dolby NR system used in this 3-head deck, when recordings are made with Dolby NR, they can be monitored after recording and are treated by the second Dolby NR circuit before being heard.

POWER REQUIREMENTS

To Set Power (Mains) Voltage:

1. This unit can be used with a power (mains) voltage of 100 to 110 V, 115 to 127 V, 200 to 220 V or 230 to 250 V. Before operating, be sure to check that it is set to your local power (mains) voltage.
2. Turn the voltage selector to your local power (mains) voltage with a screwdriver until the selector clicks.

Notes:
1. Before turning the selector, disconnect the AC power (mains) lead from the AC outlet with this unit in stop mode.
2. Be sure not to turn the selector with a thin screwdriver, etc. by force. The selector may be broken and the deck will not operate.
3. When inserting the mains plug into the AC outlet supplying 100 – 110/115 – 127 V, insert the plug with adaptor connected to it.

CONNECTIONS

This unit is not equipped with a built-in power amplifier; therefore it must be connected to a playback unit (stereo amplifier). The connection should preferably be done using the US pin sockets ㉗ and ㉘, if the stereo unit is not provided with US pin sockets, connect via a Record/playback (DIN) socket ㉖. (See diagram ㉛)
Insert the AC power (mains) lead plug into the power (mains) socket of stereo amplifier or into any convenient AC outlet.

Notes:
- Do not use the DIN lead and US pin-type leads at the same time.
- Disconnect the AC power (mains) lead plug from AC outlet when the unit is not to be used with AC power (mains) for a long period of time or you are away from home.

FUNCTIONS

TAPE SELECT SWITCH

Equalization and bias can be changed over in 4 steps. When using ferric oxide tape (Fe_2O_3), set the Tape select switch ⑬ to the "ER/UD (NOR)" position; when using chrome oxide tape (CrO_2), set the Tape select switch to the "EX/SX (CrO_2)" position; when using ferri chrome tape (FeCr), set the Tape select switch to the "FeCr" position. When using Metal Tape, set the Tape select switch to the "ME (METAL)" position.

To obtain the best performance from this unit, it is recommended that you use the tapes: HITACHI-ER (Normal position), HITACHI-EX (CrO_2 position) and HITACHI-ME (Metal position).
A high recording level with a wide dynamic range can be obtained.

OUTPUT LEVEL CONTROL

The output level should be adjusted by use of the Output level control ⑰, in order to match the input sensitivity of the power amplifier to which the unit is connected.

INPUT SELECT SWITCH

Set this switch ⑪ to match the program sources to be recorded:
LINE (▮): Set to this position for recording from the Line in sockets ⑩ or Record/Playback (DIN) socket ㉖.
MIC (▪): Set to this position for recording from the Microphone sockets ⑩ or Record/Playback (DIN) socket ㉖.

Note: Do not connect the Record/playback (DIN) socket and Line in (or out) sockets simultaneously.

DOLBY NOISE REDUCTION SWITCH/MPX FILTER SWITCH (DOLBY NR)

Set this switch to the appropriate position.
ON/MPX OFF: For recording program sources other than FM broadcasts via Dolby NR circuit or to play back tapes recorded via Dolby NR circuit.
ON/MPX ON: For recording FM broadcasts via Dolby NR circuit.
OFF: For recording or playing back without Dolby NR circuit and for playing back tapes recorded without Dolby NR.

MONITOR SWITCH (MONITOR)

Since a 3-head system is used in this unit, the recorded signal can be played back immediately after it has been recorded using US pin leads.

TAPE: Sounds recorded on the tape can be monitored as playback sound via the amp.
* Be sure to set the switch to "TAPE" for playback.
When it is set to "SOURCE", no sound will be heard.

SOURCE: The source sound can be monitored.

REMOTE CONTROL SOCKET

By connecting the remote controller (RB-100) to the Remote control socket ㉙, the movement of the tape can be controlled by this controller.

TIMER SWITCH (TIMER)

Set this switch ② to OFF when a timer is not used.
Set to REC or PLAY for recording when you are absent or for timer PLAY.
(Refer to "Recording and playback using an external audio timer" on Page 10 for details.)

Note: If the Timer switch is set to REC or PLAY when the Power switch is turned ON, REC and PLAY or PLAY indicator flashes for 3 sec. to warn you.

COMPUTER AUTOMATIC RECORDING MUTE FUNCTION

When the REC. MUTE button ㉓ is pressed during recording, the unit enters the non-signal mode for approx. 4 sec. and then automatically enters the recording pause mode.
Press the Playback button ⑳ to continue recording.
When the REC. MUTE button ㉓ is pressed continuously, the non-signal mode continues for more than 4 sec; when it is released, the unit automatically enters the recording pause mode.
This is convenient for cutting narrations or leaving gaps between tunes.

PEAK HOLD SWITCH

The peak level can be held using this switch for approx. 1 sec.

HEADPHONES

Connect headphones to the Headphone socket ⑱ to monitor the recording or to enjoy the playback material with a stereo headphone.

CASSETTE INSERTION

When the Eject button ⑮ is pressed, the cassette holder comes out toward you gradually. Insert the cassette with the exposed tape downward until it is locked, then close the cassette holder.
For cassette removal, press the Eject button ⑮ with the unit in the STOP mode and the cassette holder opens toward you for easy removal.
When the cassette is fully recorded or played back, it may be turned over to side 2 (or B) for an equal time of recording or playback.

RECORDING

Recording from a stereo system

1. Connect this unit and the stereo system using pin jack leads.
2. Set the Power switch ① to ON, insert the cassette with the side to be recorded toward you and close the cassette holder.
3. Change over the Tape select switch ⑬ to match the tape.
4. Set the Input select switch ⑪ to "LINE".
5. Adjust the bias fine adjustment control ⑤ to match the tape.
6. Set the Dolby NR switch ⑫ to ON. (Set to OFF for recording without the Dolby NR circuit).
7. Set the Auto/Memory rewind switch ⑭ to the desired position (Refer to "Auto/Memory rewind switch" on Page 9) and press the Counter reset button ⑯ so that the reading is "000".
8. Set the Monitor switch ⑧ to "SOURCE".
9. When the Pause button ㉔ is pressed while pressing the Record button ㉕, it enters the stand-by recording mode.
   Adjust the Recording level controls ⑨ so that the indication of the Digital peak meter ④ does not exceed +3 dB at maximum input.
10. Start recording by pressing the Playback button ⑳.
11. When it is desired to stop recording temporarily during recording, pre the Pause button ㉔. Press the Playback button ⑳ to continue recording.
12. Press the REC. MUTE button ㉓ to cut the sound being recorded.
    4 sec. later, the unit automatically enters the recording pause mode.
    Press the Playback button to continue recording.
13. Press the Stop button ㉒ when the recording is completed.
    When the recording is done up to the end of tape, operation is according to the position of the Auto/Memory rewind switches ⑭.

Caution: Do not turn the Power switch ① ON/OFF abruptly during recording as it may cause mis-operation.

Recording from microphones

Insert two microphones into the Microphone sockets ⑩.
Carry out the following procedure the same as "for recording from a stereo system".
For monaural recording, connect one microphone plug to the Microphone socket ⑩ marked with L/mono.
Note: Set the Input select switch ⑪ to "MIC".

Notes for recording

1. Do not use the DIN lead and US pin-type leads at the same time, or noise may be occurred.
2. A DIN lead can be used only with the amplifier. Accordingly, recording and playback are not possible by connecting the two tape decks.

Cautions on the use of Metal Tape

1. Some Metal Tape is incompletely coated with magnetic powder which causes level fluctuation, so it is recommended to clean the head, capstan and pressure roller after it is used several times. (When cleaning, be careful not to apply too much force to the head because it may cause the high frequency characteristics to deteriorate.)
2. Metal Tape recorded on this deck can be played back on another decks which do not have a Metal select switch position. In this case, set the tape selector to Chrome or FeCr for playback.

Monitoring when recording with US pin leads

Since the REC head and PLAY head are independent in this unit, the original sound being recorded can be monitored by changing over the monitor switch to "SOURCE" during recording, and the sound recorded on the tape can be monitored with the monitor switch changed over to "TAPE". Checking whether or not the recording level is adequate, or whether tone quality has deteriorated due to the dirty heads is possible.

There are following two ways of monitoring through the speakers:

- Set the monitor switch of the amplifier to "TAPE", and change over the monitor switch of this unit between "TAPE" and "SOURCE".
- Set the monitor switch of this unit to "TAPE" and change over the monitor switch of the amplifier between "TAPE" and "SOURCE".

PLAYBACK

1. Turn the Power switch ① ON and insert the tape to be played back.
2. Change over the Tape select switch ⑬ matching it to the tape.
3. Set the Dolby noise reduction switch ⑫ to "ON" or "OFF" depending on whether or not the tape was recorded with Dolby NR system.
4. Set the Auto/memory rewind switch ⑭ to the desired position.
5. Press the Playback button ⑳ to start playback. Adjust volume, tone and balance with the stereo amplifier controls.
6. When it is desired to stop the tape during playback, press the Pause button ㉔. Press the Playback button ⑳ to start playing again.
7. Press the Stop button ㉒ when playing is completed. When the tape is played up to the end, operation will depend on the position of the Auto/memory rewind switch ⑭.
   Operate this unit with the volume knob of the stereo system set to the position used when listening to broadcasts or records, and adjust to obtain the same volume using the Output level control ⑰.
   Caution: When the Output level control ⑰ is set to minimum, no sound comes out.

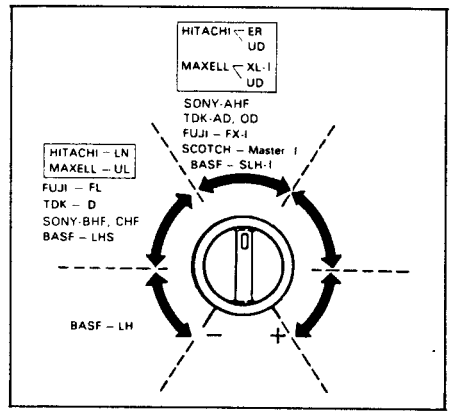
BIAS FINE ADJUSTMENT

A function to fine-adjust the bias selected by the Tape select switch is provided to this unit. It can be used without any problem by setting it to its click position for normal use. With fine adjustment, however, referring to the diagram on the next page, better frequency response can be obtained. This bias fine adjustment knob operates even if the Tape select switch is set to the ME (METAL), EX/SX (CrO_2) and FeCr positions.

At present, however, optimum bias values for these tapes are approximately the same, so setting to the center click point is sufficient. When using a tape not specified in the diagram on the next page, optimum bias values can be determined in the following way.

1. Record the FM detuning noise (white noise).
   Turn the Recording level controls ⑨ and perform recording at a level such that the 15 dB indicators of the Digital peak meter light and the 10 dB indicators occasionally light.
2. Change over the Monitor switch ⑧ between TAPE and SOURCE, and adjust the Bias fine adjustment control ⑤ so that the tone quality is the same regardless of the Monitor switch position.

3. Move the Bias fine adjustment knob slightly to the (+) side when the sound played back from the recorded tape is bright, and to the (—) side when it is dull, and then repeat items 1 and 2. Adjust so that the tone quality of the source sound and the sound played back from the recorded tape is almost the same.



* Even with tapes of the same brand, the tape thickness of C-60 and C-90 tapes is different, so different bias is needed.
* The bias fine adjustment knob can not be used during playback.

SETTING THE TAPE RECORDING CALIBRATION LEVEL

This unit has been adjusted for Hitachi tapes.
With the Tape select switch ⑬ in the correct position, the tape sensitivity is corrected, the levels during recording and playback match and adjustment of calibration is not required. It is recommended, however, to adjust the calibration levels when you want to match the level accurately or when using tape other than Hitachi tape.

1. Set the REC. calibration controls ⑥ to the center (click position).
2. Finely adjust bias using the Bias fine adjustment control ⑤ to match the frequency response.
   (Refer to page 7 — 8 for Bias fine adjustment.)
3. Use a signal with a constant signal level such as detuning noise during FM broadcasting as the recording calibration signal.
   (When an oscillator is built into the tuner or receiver, use this.)
4. Set the Monitor switch ⑧ to "SOURCE", and match the recording level so that the 15 dB indicators light and the 10 dB indicators occasionally light.
5. Next, set the Monitor switch ⑧ to "TAPE" and adjust the recording calibration knob so that the same level as with "SOURCE" is obtained.

- It is effective to perform this calibration every time the tape is changed. When this is too much trouble, however, do not touch the REC. calibration controls ⑥ because if the unit is used with its knob at its center (click) position results will be satisfactory.

  Caution: Be careful; when the REC. calibration controls ⑥ is set to min., the audio output is low when the Monitor switch ⑧ is set to "TAPE".

AUTO/MEMORY REWIND SWITCH

Auto-rewind function

Stop, rewind or play can be done automatically depending on the setting of the Auto/memory rewind switches.

Set these switches so it is effective during recording, playing and rewinding.

OPERATION MODE	AUTO/MEMORY REWIND SWITCH SETTING	AT TAPE END
Recording	**OFF**	Stop (AUTO STOP)
	STOP	Rewind to start ➡ stop (AUTO STOP)
	PLAY	* Rewind to start ➡ play ➡ rewind ➡ play....(repeated)
Playback	**OFF**	Stop (AUTO STOP)
	STOP	Rewind to start ➡ stop (AUTO STOP)
	PLAY	* Rewind to start ➡ play ➡ rewind ➡ play.... (repeated)
Rewind	**OFF**	Stop (AUTO STOP)
	STOP	
	PLAY	* Play ➡ rewind ➡ play ➡ rewind ➡ play....(repeated)
Fast Forward	**OFF**	Stop (AUTO STOP)
	STOP	Rewind to start ➡ stop (AUTO STOP)
	PLAY	* Rewind to start ➡ play ➡ rewind ➡ play....(repeated)

* Tape is played back 16 times by Auto-rewind function.

Computer memory rewind function

When the Rewind button is pressed during the recording or playback, tape is rewound to the position previsouly specified (the position where the Playback button was pressed previously).

The unit operates according to the setting of the Auto/Memory rewind switches after rewinding.

PLAY - Playback starts after rewinding.

STOP - STOP mode is entered after rewinding.

Note: When tape is rewound, to its end, the computer memory rewind function is released and the unit operates according to the setting of the Auto-rewind switches.

FAST FORWARD AND REWIND

To advance a tape rapidly to any desired point, press the Fast forward button ㉑. To stop the tape movement, press the Stop button ㉒.
In the case of Fast Forward, when the tape is wound to the end, it stops automatically regardless of the position of the Auto/memory switch ⑭.
Tape may be rewound rapidly by pressing the Rewind button ⑲.
To stop the movement, press the Stop button ㉒.
When the Auto/memory rewind switches ⑭ are set to "PLAY" during rewind, the deck automatically enters the PLAY mode. When setting to "STOP" or "OFF", the deck automatically enters the "STOP" mode.

RECORDING AND PLAYBACK USING AN EXTERNAL AUDIO TIMER

When this tape deck is used with the audio timer, timer recording or playback at the desired time is possible.

Timer recording of radio broadcasts

1. Insert the power lead of this unit into the socket of the amplifier. (Insert the power lead of the amplifier into the socket of the timer.)
2. Turn the power for the amplifier and tuner ON.
3. Operate as described in items 1 – 9 in "RECORDING", adjust the recording level and press the Stop button ㉒.
4. Set the Auto/memory rewind switches ⑭ to OFF or STOP.
   Note: Do not set these switches ⑭ to "PLAY" during timer recording.
5. Set the Timer switch ② to "REC".
   Note: If this switch ② is set to "PLAY" and the timer functions, the deck enters the playback mode, so recording cannot be done.
   When it is set to "OFF", the deck does not operate at the set time. Be careful.
6. Set the timer to the desired time.
   (Refer to the operating guide of the timer for setting the timer.)
   (Now, preparation is complete.)
7. Recording starts automatically at the set time.

Timer PLAY

1. Insert the tape you desire to play back, adjust the volume knob of the amplifier to determine the level and press the Stop button ㉒.
2. Connect the timer in the same way as in the "Timer recording of ra broadcasts" and set the timer to the desired time.
3. With the Timer switch ② set to "PLAY", PLAY starts automatically at the set time.

Cautions

- Do not use a cassette with its erasure prevention tabs snapped. When a cassette with its tabs snapped is used, the unit operates in the PLAY mode when the timer operates.
  Be careful because the chance to make a unique recording might be missed.

  Be sure to set the Timer switch (TIMER) to "OFF" except for TIMER recording/playback. When the Timer switch (TIMER) is set to REC or PLAY, recording or play starts automatically a few second after the power switch is turned ON.
  Be careful; when the erasure prevention tabs are present the previously recorded tape will be erased. Do not open/close the cassete lid for several seconds after the power is switched ON to protect the mechanism.

Cautions on use of timer

- Do not use timer recording or playback when you are absent for a long time.

ERASING

When a recording is being made, any sound already on the tracks is automatically erased before the new recording is made. Erasure is accomplished only when the recorder is in the recording mode.
If you wish to erase a tape without making a new recording, set the Recording level controls ⑨ at minimum, and the Tape select switch ⑬ to the proper position. Press the Playback button ⑳ while pressing the Record button ㉕. For erasing with less noise, set the Recording level Controls ⑨ to the minimum positions, and remove input leads etc.

MAINTENANCE

In order to keep this unit in optimum operational condition, clean the heads, capstan and pressure roller periodically with a head cleaning stick moistened in alcohol, or methylated spirit. (See diagram ㉝.) When the Eject button ⑮ is pressed, the cassette holder comes out toward you gradually. The cassette lid can be removed by lifting it while holding both of its side edges.
Never use a sharp or metallic instrument or tool for cleaning these parts.
The easiest cleaning can be performed by using a Hitachi head cleaning cassette. Hitachi cassette is provided with two pieces of head cleaning tapes on both ends of the tape; therefore, all accumulated dirt and oxide particles are removed automatically at the beginning and the end of the tape.
Demagnetization: The head is inevitably magnetized slightly after being used for a long time. As a result, high-frequency sound may be lacking or noise may be generated. Perform demagnetization of the head occasionally with a head eraser. In this case, do not touch the tape running surface of the head directly with the metallic part of the eraser, but use the eraser after protecting the head with cloth or gauze.

CASSETTE TAPES

Recording Protection: If the plastic tabs on the rear of the cassette are punched out (by a screwdriver or similar tool), the recordings can be protected against accidental erasure.
When only one side of the cassette is to be protected, with the blank side of the cassette towards you, punch out the tab on right. (See diagram ㉜.)
Precautions: If a tape is played several times continuously, especially if a thin tape (C-90, C-120) is used, the tape might be wound too tightly on the reel and cause the tape speed to fluctuate. In order to avoid this, it is recommended to tap the cassette several times lightly on a table-top which will loosen the tape on the reel. But the tape should not be too loose. Especially after fast forwarding or rewinding a C-90 or C-120 cassette, the slack should be taken up by inserting a pencil or other object in the spindle hole and tightening the tape.
4-Track Recording/Playback: After recording or playing back one side of the cassette, remove the tape by depressing the Eject button ⑮, turn the cassette over and insert it again. Then, the tape can be used again for the same recording time as the first side.

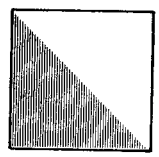
DOLBY* NR (Noise Reduction) SYSTEM

Due to the slow speed of cassette decks, tape hiss occurs. This is not audible at maximum output level but considerably degrades the playback quality of low level passages of recorded material. By using the Dolby NR system (named after the inventor), it is now possible to substantially reduce tape hiss so that it is practically inaudible during playback.
With the Dolby NR system, during recording, the level of the low passages is increased considerably; during playback these passages are reduced to their original level. Therefore, the tape hiss is also reduced by the same amount and is not audible during playback.
Before playback of a cassette, it should be ascertained if the Dolby NR switch ⑫ is set in the proper position.

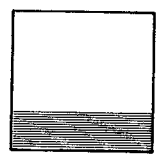
* Cassettes recorded through the Dolby NR circuit must be played back in the Dolby NR mode (if played back with normal playback equalization, the sound seems too sharp).
* Normal recordings should not be played back through the Dolby NR system (if played back with the Dolby NR equalization, the sound will seem "muddy").

The optimum adjustment of the recording and playback calibration is important for satisfactory functioning of the Dolby NR system. This adjustment is done at factory prior to shipment using a special measuring device.

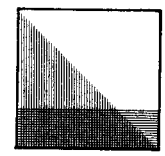
HOW THE DOLBY NR SYSTEM WORKS
Making an ordinary recording:



1. Music
Music is composed of sounds of different loudness separated by intervals of silence.
Loud and soft sounds are here shown as long and short lines. The music shown by this diagram starts loud and gradually becomes very quiet.

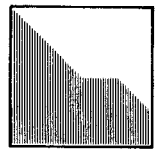


2. Noise
Any recording tape, even of the best kind, makes a constant hissing noise when played.
At the very slow speeds and narrow track widths used in tape cassettes, tape noise is much more noticeable than it is in professional tape recordings, although even there it is a problem.



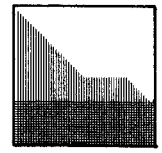
3. Music and Noise
When a tape recording is played, noise from the tape obscures the quietest mus[illegible] sounds and fills the sile[illegible] when no sound should be heard at all. Only when the music is loud the noise is not usually heard; however, tape noise is so different from music that it sometimes can be heard even then.

Making a Dolby system recording:



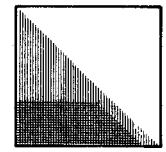
1. What the Dolby System does first.

Before the recording is made, the Dolby system "listens" to the music to find the places where a listener might later be able to hear the noise from the tape.
This happens mainly during the quietest parts of the music. When it finds such a passage, the system automatically increases the volume so that music is recorded at a higher level than it would be normally.



2. The Recording.

In a Dolby system recording, the parts of the music which have been made louder stand out clearly from the noise.
As a result, Dolby system recording sound brilliant and unusually clear even when played back without the special Dolby system circuit.



3. What the Dolby System does during playback.

When tapes are played on a high-fidelity tape deck equipped with the Dolby system circuit, the loudness is automatically reduced in all of the places at which it was increased before recording. This restores the music to its original level again.
At the same time, the noise which has been mixed with the music is reduced in level and this is by the same amount usually enough to make it inaudible.

SPECIFICATIONS

Semiconductors:	Module: 1 ICs: 6 Transistors: 36 Diodes: 44 Thermistor: 1 LED: 3 FET: 2
Track System:	4 track 2 channel
Tape:	Cassette tape (C-30, 60, 90)
Tape Speed:	4.75 cm/s
Recording system and Bias Frequency:	AC bias, 85 kHz
Erasing System:	AC erase
Erase Ratio:	65 dB (at 1 kHz) or more
Frequency Response:	ER/UD (NOR): 20 Hz to 18 kHz 30 Hz to 17 kHz (According to DIN 45 500) EX/SX (CrO_2): 20 Hz to 20 kHz 30 Hz to 18 kHz (According to DIN 45 500) FeCr: 20 Hz to 18 kHz 30 Hz to 17 kHz (According to DIN 45 500) ME (METAL): 20 Hz to 21 kHz 30 Hz to 19 kHz (According to DIN 45 500)
S/N (Signal to Noise Ratio):	Dolby NR ON: 69 dB (A weighted, Reference 3% T.H.D. Metal Tape) 69 dB (According to DIN 45 500) Dolby NR OFF: 61 dB (A weighted, Reference 3% T.H.D. Metal Tape) 61 dB (According to DIN 45 500)
Wow and Flutter:	0.038% (WRMS) 0.12% (According to DIN 45 500)
Input Sensitivity and Impedance:	Microphone:0.3 mV (Suitable microphone impedance 300 ohms to 5 kohms) Line in: 60mV, 50 kohms Record/playback (DIN): 0.3mV, 5 kohms
Output level:	0.5V or more (adjustable)
Output Load Impedance:	Line out: 50 kohms Record/playback (DIN): 470 kohms Headphone: 8 ohms to 2 kohms (Suitable)
Distortion:	Less than 0.8% (1 kHz, −3 dB)
Crosstalk:	60 dB (at 1 kHz) or more
Power (Mains) Supply:	AC 100 – 110V, 115 – 127V, 200 – 220V, 230 – 250V, 50/60 Hz
Power (Mains) Consumption:	30W
Dimensions:	11.0(H) x 43.5(W) x 26.6(D) cm
Weight:	6 kg

* Specifications are subject to change without notice for performance improvement.

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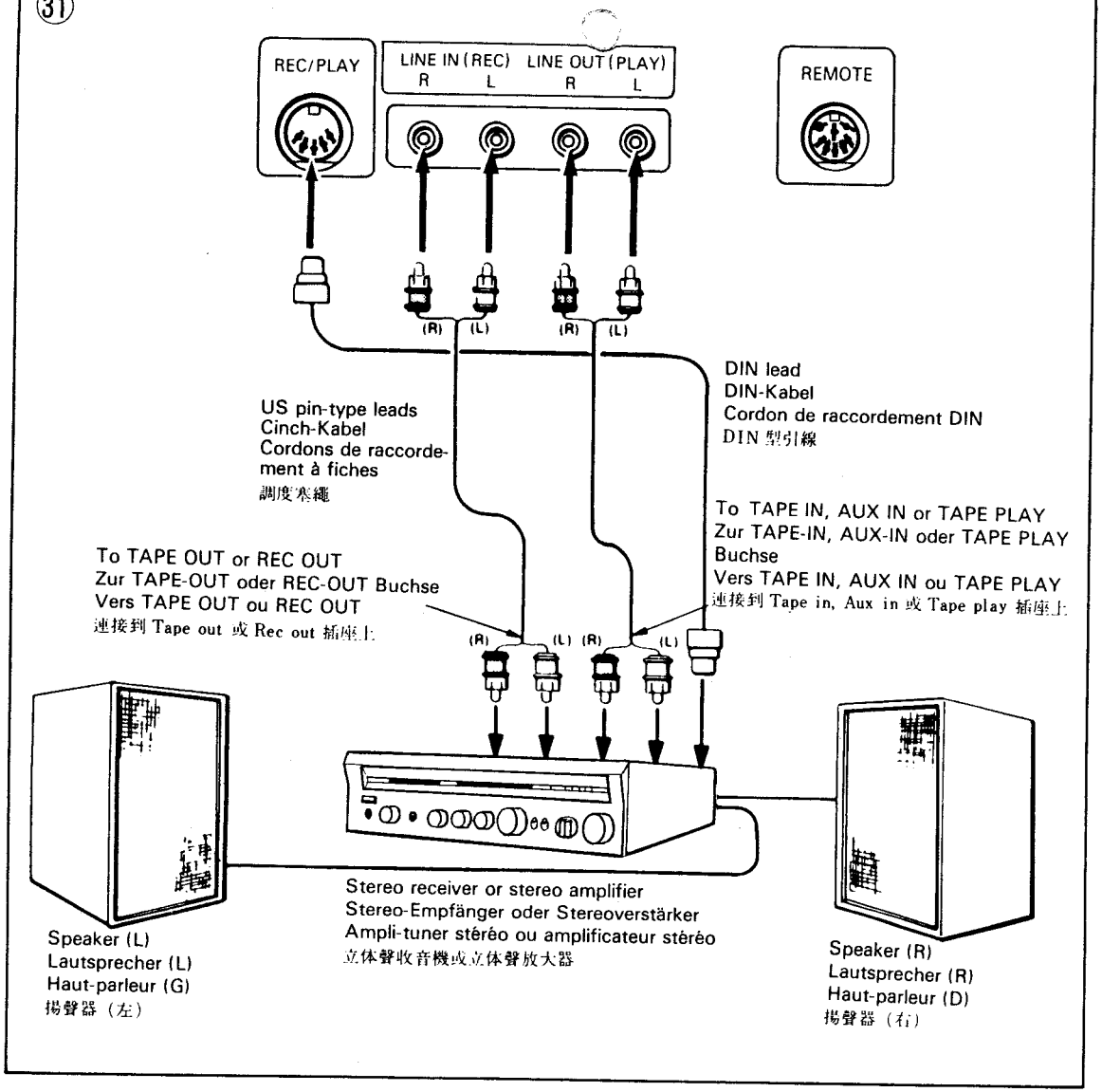
REC/PLAY
LINE IN (REC) LINE OUT (PLAY)
R L R L
REMOTE
(R) (L) (R) (L)
DIN lead
DIN-Kabel
Cordon de raccordement DIN
DIN 型引線
US pin-type leads
Cinch-Kabel
Cordons de raccordement à fiches
調度寒繩
To TAPE OUT or REC OUT
Zur TAPE-OUT oder REC-OUT Buchse
Vers TAPE OUT ou REC OUT
連接到 Tape out 或 Rec out 插座上
To TAPE IN, AUX IN or TAPE PLAY
Zur TAPE-IN, AUX-IN oder TAPE PLAY Buchse
Vers TAPE IN, AUX IN ou TAPE PLAY
連接到 Tape in, Aux in 或 Tape play 插座上
(R) (L) (R) (L)
Speaker (L)
Lautsprecher (L)
Haut-parleur (G)
揚聲器（左）
Stereo receiver or stereo amplifier
Stereo-Empfänger oder Stereoverstärker
Ampli-tuner stéréo ou amplificateur stéréo
立体聲收音機或立体聲放大器
Speaker (R)
Lautsprecher (R)
Haut-parleur (D)
揚聲器（右）

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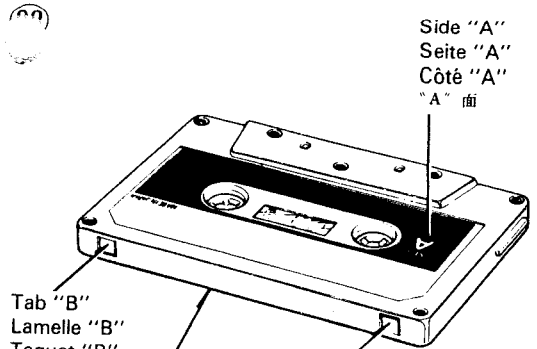
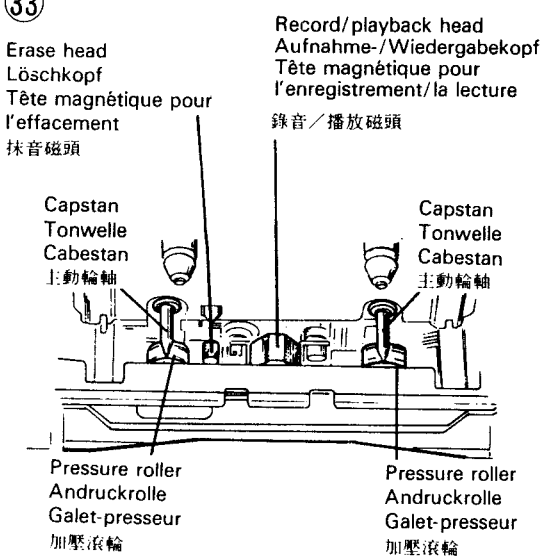

Side "A"
Seite "A"
Côté "A"
"A" 面
Tab "B"
Lamelle "B"
Taquet "B"
擋舌 "B"
Side "B"
Seite "B"
Côté "B"
"B" 面
Tab "A"
Lamelle "A"
Taquet "A"
擋舌 "A"

(33)


Erase head
Löschkopf
Tête magnétique pour l'effacement
抹音磁頭
Record/playback head
Aufnahme-/Wiedergabekopf
Tête magnétique pour l'enregistrement/la lecture
錄音／播放磁頭
Capstan
Tonwelle
Cabestan
主動輪軸
Capstan
Tonwelle
Cabestan
主動輪軸
Pressure roller
Andruckrolle
Galet-presseur
加壓滾輪
Pressure roller
Andruckrolle
Galet-presseur
加壓滾輪

D-E95

HITACHI